

9 Capital investment

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Introduction

9.1. This chapter considers BAA's capital investment performance. It first sets out BAA's actual investment in Q3 and its investment planning procedures. It then considers its projections of investment in Q4, paying particular attention to T5, which is by far the largest project. Finally, it sets out the airlines' views on BAA's investment performance.

Capital investment in the third quinquennium

9.2. Table 9.1 shows actual capital investment for 1997/98 to 2001/02 compared with the projections made at the time of the 1996 MMC report.

TABLE 9.1 Comparison of MMC4 forecasts and actual spend in Q3

	<i>£ million, 2001/02 prices</i>		
	<i>MMC4</i>	<i>Actual</i>	
	<i>1997/98–</i>	<i>1997/98–</i>	
	<i>2001/02</i>	<i>2001/02</i>	<i>Difference</i>
T5 and related*	1,370.3	343.0	-1,027.3
Heathrow Express	<u>122.1</u>	<u>169.4</u>	<u>47.3</u>
Total	1,492.5	512.5	-980.0
Other Heathrow	850.6	1,050.8	200.2
Gatwick	355.6	442.6	87.0
Stansted	<u>135.3</u>	<u>321.3</u>	<u>186.0</u>
Total South East	2,834.0	2,327.2	-506.8
Excluding T5 and related subtotal	1,341.6	1,814.7	473.1

Source: BAA.

*T5-related projects include extensions to Heathrow Express and Piccadilly Line; VCR; and ART.

9.3. It can be seen that, at 2001/02 prices, actual investment was £2.3 billion over the period, somewhat less than the forecast investment of £2.8 billion. The overall underspend against forecast of 18 per cent was more than accounted for by Heathrow where investment was 33 per cent below that previously forecast. Gatwick investment was 24 per cent above that previously forecast, whilst investment at Stansted was 138 per cent above that forecast.

9.4. The underspend at Heathrow of £780 million compared with the forecast capex at the MMC 1996 review was largely as a result of the length of the T5 planning inquiry. The MMC review in 1996 assumed that the public inquiry would conclude in 1997 and that construction of T5 would commence in 1998. The planning inquiry was actually completed in March 1999 and approval was granted in November 2001.

9.5. The underspend at T5 was partially offset by alternative investment at Heathrow and additional investment at Gatwick which BAA said would probably not have happened (at least in Q3) had T5 been built. Table 9.2 shows the projects at Heathrow and Gatwick which, according to BAA, were undertaken in lieu of the delay to T5. The total expenditure of £269.5 million (£204.9 million at Heathrow and £64.6 million at Gatwick) was thus not part of the forecast capital investment at the 1996 MMC review.

TABLE 9.2 Major projects undertaken in lieu of the T5 delay

£ million, 2001/02 prices

	1997/98	1998/99	1999/00	2000/01	2001/02	Total 1997/98– 2001/02
HAL						
<i>Major projects</i>						
T3 departure lounge extension	3.3	18.9	23.9	18.8	19.9	84.8
T1 departure baggage sortation	0.1	11.5	0.7	0.3	0.0	12.6
T1 arrivals concourse	0.6	6.9	1.0	0.0	0.0	8.5
T4 coaching station	1.3	9.5	3.2	0.1	0.0	14.0
Metro stands	0.0	0.0	2.3	4.4	0.6	7.3
T1 arrivals forecourt	0.9	2.1	0.0	0.0	0.0	3.0
MSCP1A ent & exit & link road	0.4	1.4	0.0	0.0	0.0	1.8
Additional baggage facility 1.5	0.0	0.0	1.4	0.6	0.0	2.0
Grass area 12 push and hold stands	0.0	0.0	2.4	1.0	0.0	3.4
Iceberg	0.0	0.0	0.0	6.5	0.0	6.5
T1 FC eastern extension (enabling)*	0.0	0.0	0.0	1.4	4.5	5.9
T1 FC eastern extension	0.0	0.0	0.0	0.0	28.9	28.9
T1 FC southern extension	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>26.3</u>	<u>26.3</u>
HAL total	<u>6.6</u>	<u>50.2</u>	<u>34.9</u>	<u>33.2</u>	<u>80.1</u>	<u>204.9</u>
GAL						
<i>Major projects</i>						
New stands development (tower stands)	7.0	13.1	0.0	0.0	0.0	20.1
Runway 26L/08R resurfacing	0.0	0.0	2.7	13.4	0.0	16.1
Runway 26L RET	0.0	0.0	0.0	4.2	0.5	4.7
Concorde House extension	0.0	0.7	6.7	2.3	0.1	9.8
APV gates	0.8	0.0	0.0	0.0	0.0	0.8
NT airside coaching	0.0	0.0	0.0	1.9	0.0	1.9
NT temporary APV	0.7	1.0	0.0	0.0	0.0	1.7
Permanent APV, NT	<u>0.0</u>	<u>1.3</u>	<u>8.0</u>	<u>0.2</u>	<u>0.0</u>	<u>9.5</u>
GAL total	<u>8.4</u>	<u>16.2</u>	<u>17.4</u>	<u>22.0</u>	<u>0.5</u>	<u>64.6</u>
Total	15.0	66.4	52.3	55.3	80.6	269.5

Source: BAA.

*See paragraph 9.62.

9.6. According to BAA the £186 million additional spend at Stansted was to accommodate an unforeseen 60 per cent uplift in passenger numbers above that forecast and the requirement to provide appropriate passenger facilities. BAA said that much of this growth might not have occurred had T5 been open.

9.7. In addition to the impact of the delay of T5, BAA told us that the majority of projects for Heathrow and Gatwick in the 1996 MMC review were subsequently redefined for a variety of reasons, such as changing stakeholder requirements or planning issues. Overall, BAA believed that around £100 million additional actual expenditure had resulted from these factors at Heathrow and Gatwick. Changes in the nature of airline operations such as the growth in the low fares sector at Stansted had also led to a substantially revised capex requirement and profile.

9.8. In the latter half of 2001/02, following the events of 11 September and the subsequent reduction in passenger numbers, BAA undertook a review of current capital investment. In the light of this, a number of projects were postponed, with Gatwick being the most affected airport. Projects postponed at Gatwick airport included North Terminal Pier 6, North West zone stands and taxiways, long-term car parking expansion and the South Terminal Pier 2 reconfiguration. The only projects postponed at Heathrow were elements of the T1 future concepts project. The terminal arrivals extension project was put on hold at Stansted. These projects formed a relatively small part of the overall investment programme.

9.9. A number of major projects were completed during the 18 months to April 2002. At Heathrow these included the rehabilitation of the northern runway, the Victor cul de sac rehabilitation and the Heathrow transfer facilities sortation project. At Gatwick the completed major projects included the North and South Terminal IDL extensions, the South Terminal check-in 2001 project and the North Terminal Pier 4 extension. At Stansted the phased opening of the terminal extension was completed.

Investment planning

Project and investment evaluation

9.10. BAA told us that the key issues which underlay its investment decisions were:

- (a) an accurate assessment of forecast demand/opportunity including key assumptions;
- (b) the options considered, including those which might not require any, or required little, capex, ie 'do nothing' or 'do minimum';
- (c) a proposed solution which is most appropriate to meet the business need and which maximizes shareholder value (or alternatively minimizes loss of shareholder value in the case, for example, of asset replacements);
- (d) the appropriate balance between cost (capital and future operating costs), time (delivery programme) and quality of facility to be provided with the resulting impact on customer service, with supporting benchmarks against previous comparable projects where possible;
- (e) a thorough and systematic assessment of risk (sensitivities should be performed to gauge the potential impact of cost and income fluctuations on the financial appraisal);
- (f) the availability of appropriate funding or headroom within previously agreed capital budgets;
- (g) the value that is added or subtracted from the group after taking into account all relevant cash flows and the payback period;
- (h) the effect on the group's profit and loss accounts; and
- (i) a clear understanding of how the business benefits and performance of the investment would be measured against predefined targets, using the Investment Performance Review process.

9.11. Discounted cash flow techniques are used by BAA to assess the incremental cash flows associated with investments. The NPV and the internal rate of return (IRR) of individual projects are calculated, and compared with the test discount rate or hurdle rate which has been set for that part of the business. These rates are based on BAA's estimate of the group's cost of capital which, at the time of our inquiry, was 9.5 per cent post-tax nominal.

9.12. Other risk premiums are added or subtracted according to the degree of protection or exposure to construction cost, price risk, volume risk and business experience. The basic hurdle rate is 12 per cent average (post-tax nominal) which can be increased by 3 per cent for business cases with a high risk on cost or a high dependency on traffic forecasts; and reduced by 3 per cent in low-risk areas.

9.13. All airport infrastructure projects are assessed against these hurdle rates. However, BAA told us that it was only part of the assessment criteria as there were a number of other factors which influenced BAA in its capital investment decision-making.

9.14. It appears from the above that value for money (VFM) is an important criterion in evaluating capital investment. This VFM assessment is, however, somewhat circular. Project appraisals assume a level of incremental revenue that depends on assumptions about future price controls. These price controls have themselves been assessed on the basis that BAA's future capital investment will earn a return equal to the cost of capital assessed by the CAA and the CC.

9.15. Some projects are non-remunerative as they either produce no return or the return is impossible to assess. Such projects are based on an assessment of the best VFM on an NPV basis. BAA told us that it would not formally take account of external benefits to airlines or other users in appraising a project. However, a key issue in evaluating investment was to demonstrate that schemes met the requirements of the users and others, such as statutory authorities, and then to examine alternative ways of meeting those requirements, often in consultation with users.

The project planning and development process

9.16. BAA has sophisticated guidelines and procedures for project planning and development. This is referred to as CIPP. It includes proprietary software for assessing the business case for projects. The guidelines and procedures are described in Appendix 9.1.

Master plans

9.17. Driven by the need for greater flexibility in order to meet rapid and unpredictable changes in the business environment, BAA had moved away from the concept of master plans for each airport in the 1970s and 1980s. During Q3, it reintroduced the concept and BAA told us that a long-term master plan for Heathrow was set out in the T5 planning application. BAA felt that the need to maintain a rigid plan through the long public inquiry process meant that it could not then publicly consider alternative development strategies for Heathrow. BAA also said that explicit master plans also exacerbate its difficulties in dealing with local planning authorities.

9.18. By 1998, BAA said that it was undertaking work to produce a range of strategic development options for the long-term development of Gatwick. Around 15 options were evaluated, in conjunction with BA and NATS. According to BAA, the developments were shaped according to the evolving needs of passengers, airlines and other business partners, and always with an eye to the future needs of the airport. Airlines were asked to respond to BAA Gatwick's Draft Development Strategy, before a preferred option was selected. BAA has still not chosen between the various options, partly it said at the request of BA, as it was awaiting more information regarding the Government's thinking about runway studies.

9.19. Concerns over the absence of master plans for Heathrow and Gatwick over a number of years have been voiced by the London Airports Consultative Committee (LACC) and some airlines. The views of these parties are detailed in paragraphs 12.126 to 12.141.

Planning standards

9.20. BAA applies its planning objectives and facilities guidelines when planning new developments to assist its managers in assessing the appropriate capacity and size of future facilities. These planning objectives are described in paragraphs 6.159 to 6.166.

South East and East of England Regional Air Services study

9.21. The Government and the aviation industry are faced with the problem of an increasing shortage of runway capacity in the South-East over the next 15 years and more. In 1999, the Government announced the SERAS study. The objectives of SERAS were to give a better understanding of the demand for, and constraints on, airports and air service development in the South-East and East of England over the next 30 years, and to consider options for sustainable development of airports and air services. The main consultation document was published in July 2002 and included a range of options including possible new runways at Heathrow and/or Stansted but not at Gatwick, where a second runway has been ruled out for the time being.

9.22. BAA has included an allowance for investment in additional runway capacity in the South-East, at an unspecified location, in its future capital programme. However, until a government decision is made, the site or scope of what is required is uncertain. BAA has made the assumption that costs would be incurred from 2005/06 and an allowance of £1.4 billion has been included for this project (though most of it falls in Q5).

The capital investment programme

9.23. BAA's internal procedures for developing and reviewing its CIP are orthodox. The Capital Projects Committee is responsible for reviewing the Group's annual proposals for investment in capital projects as part of the business planning cycle and recommending an annual capital budget to the

Management Committee. These proposals are prepared from submissions from each airport, prepared in accordance with set categories and guidelines, as shown in Table 9.3.

TABLE 9.3 **BAA London airports: project classifications and project examples, 2001/02**

Category	Classification of projects	Project example
1	Safety, security & environmental	Segregation of Pier 5, Heathrow
2	Capacity	T5, Heathrow
3	Service quality	Satellite 3, Stansted
4	Revenue generating	New aircraft hangar, Heathrow
5	Replacement/refurbishment of existing assets	Taxiway Y reconstruction, Gatwick
6	Process/productivity improvement	
7	Other	

Source: BAA.

9.24. Table 9.4 categorizes capital investment for BAA's London airports in terms of the 2001/02 spend. Table 9.5 gives the same figures as percentages of total spend at each airport.

TABLE 9.4 **BAA London airports: classification of capex, 2001/02**

Category	Classification of projects	£ million, 2001/02 prices			
		HAL	GAL	STAL	Total
1	Safety, security & environmental	8.5	8.3	3.0	19.8
2	Capacity	244.8	17.9	49.3	312.0
3	Service quality	10.6	24.9	28.9	64.4
4	Revenue generating	53.3	14.0	1.0	68.4
5	Replacement/refurbishment of existing assets	42.9	13.2	3.7	59.8
6	Process/productivity improvement	0.0	0.0	0.0	0.0
7	Other, eg community projects, staff facilities	0.0	0.0	0.0	0.0
	Total	360.1	78.3	85.9	524.3

Source: BAA.

TABLE 9.5 **BAA London airports: percentage breakdown of capex, 2001/02**

Category	Classification of projects	per cent			
		HAL	GAL	STAL	Total
1	Safety, security & environmental	2.4	10.6	3.5	3.8
2	Capacity	68.0	22.8	57.4	59.5
3	Service quality	3.0	31.8	33.6	12.3
4	Revenue generating	14.8	17.9	1.2	13.0
5	Replacement/refurbishment of existing assets	11.9	16.9	4.3	11.4
6	Process/productivity improvement	0.0	0.0	0.0	0.0
7	Other, eg community projects, staff facilities	0.0	0.0	0.0	0.0
	Total	100.0	100.0	100.0	100.0

Source: BAA.

9.25. Tables 9.4 and 9.5 classify each investment in one category alone. In practice, the majority of projects will have outputs covering several of these categories. For example, CIP lounges expenditure would cover categories 3 and 4, whilst a runway lighting system may include categories 1, 2 and 5.

Consultation

9.26. BAA's consultation processes are discussed under Quality of Service in Chapter 6. Important elements are consultation with airlines on the CIP and on individual projects.

BAA's partnership approach to capital investment

9.27. BAA told us that before the last review it had introduced a partnership approach to projects. This involved continuous improvement of its own processes, those of its suppliers and the way in which the client and supplier teams work together. BAA and the supplier(s) also share the risks and rewards of delivering the project, ie mutual objectives. BAA told us that the partnership approach has delivered greater efficiencies in its construction programme. It added that off-site manufacturing and standardization of construction products have led to more efficient on-site construction, reduced disruption to the busy airport environment and improved value. It said that standard solutions had been developed for a number of products including link bridges, toilets and car parks that had reduced costs by 20 per cent and on-site assembly by up to 75 per cent. BAA said that the £60 million terminal extension at Stansted had opened three months ahead of schedule and at a saving of around 8 per cent on the original 1991 budget forecasts. It claimed that, through collaborative design and re-engineering, the volume of soil disposed off-site for the M11 slip road project had been reduced by 70,000 cubic metres.

9.28. WT commented on BAA's procurement approach in their final report to the CC in September 2002. The comments are detailed in paragraphs 9.72 to 9.75.

Future capital investment

Investment strategy

9.29. BAA told us that its future CIP is a medium-term development strategy that aims to maximize utilization of existing runway capacity in the South-East, whilst ensuring high levels of safety and security and delivering a high level of service quality. It said that the key components of the strategy were:

- (a) the completion of phase 1 of T5 as rapidly as possible;
- (b) the implementation of early works to provide for the advanced release of stands prior to the opening of T5, in order to meet short-term demand, including the construction of the ART by 2005;
- (c) the continuous build of phase 2 of T5 (subject to demand growth);
- (d) the progressive redevelopment of the CTA at Heathrow to manage the anticipated high levels of traffic until T5 opens;
- (e) the completion of works to the airfield Western Apron and piers to allow for the introduction of the A380 aircraft from spring 2006;
- (f) the progressive build-out of Gatwick to ensure its passenger-handling capacity meets the full capacity of the existing runway. This is primarily focused on the expansion of the North Terminal, aprons and airside (the timing and specification of this part of the strategy is dependent on the mix of traffic that in turn depends on the resolution of 'open skies', the BA strategy, and the actions taken by other Gatwick airlines;
- (g) the completion of the approved Stansted terminal by the construction of an eighth bay on the arrivals end of the building, and the progressive addition of further bays to take the terminal to 25 mppa and beyond subject to planning consent;
- (h) the phased completion of the schemes at Heathrow and Gatwick to implement the segregation of arriving and departing passengers, in accordance with DfT requirements; and
- (i) continued expenditure on the renewal of facilities and systems, to avoid degradation of assets and service quality.

9.30. BAA said that the aims of the strategy had evolved in consultation with stakeholders over the last five years but that two further options were available. The first was to reduce investment with the objective of holding down user charges. However, BAA had not detected support for this strategy. At Gatwick and Heathrow, it said, most pressure from airlines had been for the inclusion or acceleration of more projects.

The second option would be to spend more, and more quickly. BAA believed this to be unfeasible. In its view, the scale of current planned expenditure and its implications for charges, the difficulties of obtaining planning consents and the logistical difficulties of building on constrained and intensively utilized sites, particularly at Heathrow, formed an effective cap on the programme.

Overview of investment programme

9.31. Table 9.6 summarizes BAA's capex programme, at constant 2002 prices, distinguishing between investment in T5 and other investments at Heathrow, and the other two airports. T5 accounts for over 57 per cent of projected capex over Q4—some £2.9 billion out of a total of some £5.03 billion—and 17 per cent of expenditure in Q5.

TABLE 9.6 BAA's capex programme at constant 2002 prices

£ million, 2002 prices

	Q3	Q4					Q4	Q5	Total cost
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09–2012/13		
HAL									
T5	275.1	560.6	621.4	678.7	512.2	522.3	2,895.3	414.2	3,584.6
Other specified projects	296.8	268.9	221.0	246.1	233.7	229.1	1,198.8	1,179.7	2,675.3
Other	61.8	46.9	44.1	67.1	70.6	71.9	300.5	284.5	646.7
Slippage	-38.5	-25.0	-25.0	-30.0	-40.0	-50.0	-170.0	-140.0	-348.5
Total	595.1	851.4	861.5	962.0	776.5	773.2	4,224.6	1,738.3	6,558.1
GAL									
Specified projects	17.0	58.6	72.5	88.5	115.8	128.4	463.8	375.9	856.7
Other	27.0	27.1	23.7	10.7	9.8	15.5	86.7	35.6	149.2
Slippage	-4.0	-8.0	-9.0	0.0	0.0	0.0	-17.0	0.0	-21.0
Total	40.0	77.7	87.2	99.2	125.6	143.9	533.5	411.5	985.0
STAL									
Specified projects	37.7	42.5	55.8	40.3	25.2	51.8	215.5	274.8	528.0
Other	7.3	6.2	9.1	18.4	3.7	33.2	70.6	15.6	93.5
Slippage	-5.0	-14.0	2.0	0.0	0.0	0.0	-12.0	0.0	-17.0
Total	40.0	34.7	66.9	58.7	28.9	85.0	274.2	290.4	604.6
All London airports	675.1	963.8	1,015.6	1,119.9	930.9	1,002.1	5,032.3	2,440.2	8,147.6

Source: BAA.

9.32. A breakdown of the CIP by airport and by individual project is shown in Appendix 9.3.

9.33. BAA suggested that the investment programme for each airport should be seen as having five elements being:

- (a) a one-year budget, which is a specific and detailed estimate of capex built up from many individual projects that have already been costed in detail and agreed by the airlines through BAA's project approval process (see Appendix 9.1) and within consultation forums where appropriate;
- (b) a business plan for the following two years that sets out the projects in considerable detail. These projects will be at varying stages of the project approval process and as such are subject to amendment but are unlikely to suffer significant shifts in the overall level of expenditure;
- (c) major capacity and service quality projects that extend over several years such as T5, Gatwick North Terminal and the Stansted pre- and post-15 mppa developments. These projects have been subject to detailed specification and consultation to the extent that the business rationale has been developed and planning applications can be made. The main uncertainty with the projects is the timescale for planning permission. T5 was subject to a public inquiry and BAA hopes not to incur similar delays by seeking approval to the Stansted scheme without a public inquiry;
- (d) broadly defined projects in the three- to ten-year period that are included in the plan in recognition of the likely need for investment in that area. These projects have not been designed or costed in

detail although BAA believes that the overall level of spending is likely to be in the order of the amount provisioned although subject to changes in industry conditions that lead to changes in intent or timing; and

- (e) an allowance for continued spending on minor projects, including renewals, and an allowance for slippage of such expenditure.

9.34. Table 9.6 includes slippage provisions for each airport. These have been derived on a high level basis but are designed to reflect the possibility of time delays particularly given the difficulties in implementation at constrained sites operating in sensitive planning environments.

9.35. We next consider the major projects included in BAA's projections for the next five and ten years, and particularly T5; and the projections of expenditure on smaller projects.

Short-term plan

9.36. Within the overall investment strategy, the projects that have started or are planned to start at Heathrow over the next three years include: DfT passenger segregation projects; the start of onsite work at T5; the T1 'Future Concepts' project; T3 arrivals and departures improvements; construction of the ART, leading to additional aircraft stands on the western apron; phase 2 of the Pier 5 extension project; and various projects to accommodate the large new A380 aircraft.

9.37. At Gatwick, the short-term plan includes the extension of the South Terminal arrivals area, segregation work on Pier 2 and Pier 3 and the addition of aircraft stands.

9.38. At Stansted, the short-term plan includes an arrivals extension to the terminal, the completion of satellite 3 and the building of taxiway extensions.

9.39. These projects are discussed in more detail in Appendix 9.2.

Terminal 5

9.40. By far the most significant item of capex for BAA is T5. BAA forecast passenger numbers at its south-east airports were likely to reach around 153 mppa by 2012/13 and along with representatives of the airline industry argued that capacity in the South-East must be provided to meet this demand.

9.41. In February 1993, BAA applied for planning permission to develop a new fifth terminal at Heathrow. The development was the subject of a public inquiry that ended in March 1999. Government approval followed in November 2001 and phase 1 construction has commenced. BAA has obtained local planning consents for details including the diversion of the Duke of Northumberland and Longford rivers and substantive works on site have started.

9.42. The proposed site, formerly occupied by Perry Oaks sludge works, is on the western side of the airport between the two runways. T5 will be constructed in two phases, and once completed, will provide a new terminal complex at Heathrow with a total capacity of around 30 mppa bringing the total capacity of the airport to around 90 mppa.

Phasing of construction

9.43. Table 9.7 shows BAA's plans to phase the development of T5 capacity.

TABLE 9.7 T5 development phasing

Phase	Commencing	Opening year	Capacity mppa	Construction costs 2002 prices £m
1	2002	2008*	20–22	2,711†
2	2007	2011	10	422
Total			30–32	3,133

Source: BAA.

*Stands to be brought online from 2004.

†Includes all expenditure to date.

9.44. Phase 1 includes the clearance of the Perry Oaks site and construction of: a Core Terminal Building, one satellite building connected by automated TTS, associated roads, taxiways, stand infrastructure and ancillary facilities such as car parks, sub-stations, waste and sanitation facilities and security control posts. The Core Terminal Building will be built as a single box construction progressively fitted out to meet demand through phases 1 and 2. It will comprise 275,000 square metres of floor space over seven levels (four above and three below ground). The satellite building will occupy 81,000 square metres of floor space, also over seven levels. By comparison T4 occupies 100,000 square metres of floor space. A total of 42 stands will be provided in phase 1 (five more stands in 2009) providing capacity for 20 mppa. Phase 1 is scheduled to be operational for the summer season 2008, although BAA's objective is to bring aircraft stands online as soon as possible beginning in summer 2004.

9.45. Phase 2 will comprise a second satellite building, which is expected to provide additional capacity of around 10 mppa. The second satellite building will require an extension to the TTS system and deliver a further 12 aircraft stands (making 59 in total) and associated airside roads and taxiways. The need and timing of phase 2 together with the extension to phase 1 will be driven by the need to maintain pier service levels.

9.46. BAA has proposed that increases in airport charges should be related to project progress, giving it a strong incentive to complete T5 on schedule and ensuring that airlines only pay increased charges as and when there is demonstrable progress. The four 'triggers' proposed by BAA are:

- (a) completion of diversion of twin rivers 2004/05;
- (b) early release stands completion 2004/05;
- (c) VCR handed over to NATS 2005/06; and
- (d) core terminal building weatherproof 2006/07.

9.47. The CC asked BAA if it would consider an additional 2003/04 trigger for T5 and a Gatwick trigger. BAA replied that an additional T5 trigger has been looked at but that there is a need to retain flexibility in this area. BAA believed that the BA proposal for using Pier 6 as a charges trigger for Gatwick was a reasonable suggestion and should apply in financial year 2006/07. According to BAA, other projects over Q4 at Gatwick are much less certain in terms of their scope and timing and so their suitability as triggers is very limited.

Benchmarking and best practice

9.48. A benchmarking study was undertaken by BAA on the T5 project in early 2002. The main purpose of the exercise was to identify best practice and demonstrate that T5 project costs represented VFM when benchmarked against similar BAA projects as well as projects external to BAA.

9.49. The benchmarking task team comprised BAA's Single Commercial Team, EC Harris, Turner & Townsend and Parsons Brinckerhoff. Thirteen separate facilities were identified to be benchmarked and a series of internal and external projects were analysed at facility, system and component levels.

9.50. On the basis of the data analysed, the benchmarking exercise and associated report concluded that the majority of the current T5 costs for the facilities analysed were close to, if not less than, the benchmark

mean for the sampled projects. Some facilities such as the surface and multi-storey car parks, the control tower and tunnelling indicated current T5 costs to be higher than the benchmark mean. The reasons for these adverse variances were outlined in the report, which also contained a proposal for the 'way forward' in terms of an ongoing benchmarking process.

9.51. WT, commenting on the T5 benchmarking, made recommendations in its final report to the CC in September 2002 (see paragraphs 9.74 and 9.75).

Risk assessment

9.52. PricewaterhouseCoopers (PwC) prepared a report for HAL in August 2001 in connection with HAL's consideration of project risks associated with the delivery of T5 at Heathrow. The analysis involved:

- (a) aggregation of risk analysis performed by the BAA design and delivery teams on the individual project components and high-level assessment of project-wide risk. PwC applied this information to a project-wide, probability-based financial analysis to estimate the range of probable project costs; and
- (b) contrast of the T5 project with performance of other major civil engineering projects in the airport and other industries, to produce a holistic analysis.

9.53. PwC found that the T5 project was complex and faced material risks throughout the key areas of commencement, scope change, construction, integration, significant disruption and commissioning. BAA's approach to risk mitigation and management was found to centre on design and procurement through partnership contracting, allowing much greater involvement and control over project development. PwC believed that this approach increased corporate exposure to project cost overruns and delays, subject to insurance protections that BAA puts in place.

9.54. PwC's assessment concluded that:

- (a) the current level of contingency did not appear inappropriate, given the assumptions and a risk neutral perspective;
- (b) though difficult to make a statistically-based assessment of the probability of a 'catastrophic event' occurring without further work, the impact on expected¹ costs of a single such event was not great but the impact on actual costs in the unlikely event it occurred would be significant;
- (c) programme risks and major disruptions causing a hold-up to the programme once in full flow and running at maximum overhead cost, represented the largest source of risk; and
- (d) the uncertainty surrounding the outcome of the planning inquiry and protestor and legal responses appeared to have a large impact on expected costs but that much of this uncertainty would be resolved as the results of the planning inquiry became known.

9.55. Based on this basic risk assessment, PwC concluded that the contingency of some £600 million established by BAA was of the right order of magnitude.

9.56. The review highlighted other areas that PwC believed would benefit from further analysis. These included:

- (a) a more detailed risk assessment, focusing on areas of integration risk and catastrophic events;
- (b) the appropriateness of BAA's attitude towards project risks;
- (c) further consideration of the impact of cost overruns at the corporate level, in terms of cash flows and credit ratings; and

¹Statistical measure calculated as the cost multiplied by its probability of occurrence.

- (d) analysing T5 project contingency needs versus other corporate calls on funds to enable BAA better to manage risk exposure across the group.

9.57. WT's comments on BAA's assessment of risk are detailed in paragraph 9.70.

Occupancy of T5

9.58. In consultation with the industry BAA established three criteria for deciding the likely occupiers of T5. These were:

- (a) the allocation should enable the best use of Heathrow's overall terminal and apron capacity;
- (b) the number of passenger transfers able to take place without changing terminals to be maximized; and
- (c) the number of airlines required to move between terminals to be minimized.

9.59. BAA employed consultants Economics Plus to build a computer model to test various options using these criteria. The tests demonstrated that the T5 occupancy best suited to the criteria was BA. BAA consulted individual carriers and groups of airlines to ensure that appropriate infrastructure will be in place for airlines remaining in the CTA when T5 opens. This resulted in a number of additional projects being included in the current CIP before T5 opens. The details of these projects and the inter-terminal connectivity projects are set out in Appendix 9.2.

9.60. BAA has not yet committed to a long-term allocation of airlines between the other terminals after the opening of T5. The opening of T5 is six years away and BAA believes airlines will be reluctant to commit plans to move or stay until nearer the time. Also, there may be a need by that time to accommodate more US carriers at the airport if an 'open skies agreement' is forged between the UK and the USA. BAA has said that it is continuing to discuss individual requirements with airlines. In about 2005, it will launch a full-scale consultation with the total airline community, on the distribution of airlines between the terminals.

Other major projects

9.61. Appendix 9.3 shows the phasing of expenditure on major projects by airport included in the BAA CIP. The following notes give an outline of the background to most of these projects and the reasons why they are required.

Heathrow

9.62. The purpose and general details of the highest expenditure major projects (more than £75 million) are detailed below. Other major projects are described in Appendix 9.2.

- (a) The Pier 5 Extension Phase 2 and Segregation project provides pier service to an additional three aircraft stands and segregates the length of Pier 5 (total capex of £80 million).
- (b) Pier 6 reconfiguration will provide a new segregated Pier 6 with ramp accommodation and service to three A380 stands. There is also potential for a new airside link to T2 to improve connectivity and enable stand usage by T2 airlines (total capex of £87 million).
- (c) The Terminal 3 Departures Development is nearing completion, accommodating additional demand from T3 airlines and alliance groups until the opening of T5. A wide range of passenger facilities and an already operational new security search area are also provided (total capex of £108 million).
- (d) The scope of the Terminal 3 Departures/Check-in/Arrivals Concourse Development project is yet to be determined in detail. The opportunity of expansion of the terminal landside facilities into the

area currently occupied by the T3 car park would enable expansion and improve the quality of the check-in area and the arrivals landside concourse (total capex of £205 million).

- (e) T1 Eastern extension forms part of the Future Concepts Strategy for T1 which enables additional long-haul flights to operate from the terminal (total capex of £154 million). The chief elements of the project are:
 - (i) reconfiguration of four stands to create room for an extension of the building;
 - (ii) two-storey extension of the departures building; and
 - (iii) the additional space at apron level will enable reconfiguration of the baggage system.
- (f) Terminal 1 Pier 3 Segregation and Future Development will provide segregation on the pier and includes a major refurbishment (total capex of £81 million).
- (g) Multi-Storey Car Parks Structural Works and Upgrade refurbishes all of the existing short-stay multi-storey car parks within the CTA (total capex of £86 million).
- (h) The CTA Long Term Development Strategy T1/T2/T3 Consolidation is a long-term development strategy for the airport devised by BAA and the LACC. Though in the early stages of development, it is likely that it will focus on the eastern apron and terminal complex and will provide additional integrated facilities for the forecast increase in long-haul passengers (total capex of £245 million).
- (i) The CTA Landside Redevelopment Strategy project will deliver a reshaped road system; direct access to each of the terminals for public transport; elevated pedestrian access between the principal landside facilities and the terminals; new car parks; and provision for a hotel and additional office accommodation (total capex of £127 million).
- (j) The Baggage Connections Post-T5 (System Solution) project has three phases and provides an automated integrated transfer baggage system linking all of the terminals post the opening of T5 (total capex of £297 million).
- (k) The New Generation Large Aircraft (NGLA) Taxiways project upgrades the taxiway system to comply with new licensing requirements to enable the introduction of new aircraft types (total capex of £81 million).
- (l) ART provides a road tunnel link from the CTA to the western apron and allows the use of the remote stands so improving capacity (total capex of £136 million).

Projects not included in the Core Programme

9.63. One of the additional investment proposals that BAA is considering is a TTS linking terminals at Heathrow. The project would be an extension of the T5 TTS with stations at T3, the flight communications centre and T4. The project is at the early stages of consideration but was presented to the LACC in February 2002. At this stage, BAA has assumed that investment in the project would start from 2005/06.

Gatwick

9.64. The purpose and general details of the highest expenditure major projects (more than £75 million) are detailed below. Other major projects are described in Appendix 9.2.

- (a) The North Terminal Pier 6 project provides a new pier and additional pier-served stands and makes use of a revolutionary 'overbridge' to link them to Pier 4 (total capex of £85.4 million).
- (b) The Midfield Pier (including TTS) project ensures an appropriate level of pier service to cater for future North Terminal traffic, with the provision of a baggage hall and a transit link for passengers from the North Terminal (total capex of £243.8 million).

- (c) The North West (NW) Zone project has four phases and involves the construction of new stands within the NW zone, taxiway connections and necessary relocations (total capex of £133.5 million).
- (d) Stands/Taxiways provides taxiway enhancements and additional remote stands (total capex of £64 million).

Stansted

9.65. The purpose and general details of the highest expenditure major projects (more than £50 million) are detailed below. Other major projects are described in Appendix 9.2.

- (a) Phase 3 Other Projects represents development beyond Stansted's current planning permission, including further additions to the aprons, services, access and other facilities to meet expected growth in demand (total capex of £77.9 million).
- (b) The Other Approved Terminal and Satellite Development project provides additional passenger circulation space, baggage reclaim capacity, pier-service and increased capacity/flexibility on the TTS network (total capex of £101.1 million).
- (c) The Phase 3 Terminal Development project meets forecast passenger growth via an extension to the departures end of the terminal building. This allows for additional check-in facilities, baggage infrastructure and passenger circulation areas, together with support facilities and space for retail outlets (total capex of £57.2 million).

Our consultant's assessment of proposed projects

9.66. We asked WT to:

- (a) examine BAA's past capital investment performance;
- (b) examine the future plans of BAA's CIPs; and
- (c) assess the efficiency and effectiveness with which BAA were likely to implement the programmes.

9.67. We asked WT to comment specifically on the proposed capex for the T5 project and to review a number of recently completed and future projects to be undertaken at the three airports. WT also reported on a number of issues surrounding BAA's procurement processes. BAA's response to the WT report is given in paragraphs 9.76 to 9.80.

Terminal 5

9.68. WT was asked to assess whether, under the stated assumptions, the capex programme reflected the likely capital costs that should be incurred by an efficient airport operator.

9.69. WT recommended that an independent review of the construction cost and risk provision for T5 be undertaken. They noted the trend of upwardly spiralling cost for T5. The cost of T5 in the CIP has increased from £1.8 billion in constant 1996/97 prices to £2.71 billion in April 2002. WT also noted that a number of the largest elements of phase 1 of the T5 project had challenging cost targets when benchmarked against similar facilities and that given the history of cost escalation to date, a further review would be beneficial.

9.70. WT noted that some £250 million of a corporate contingency provision of £420 million had been allocated as at July 2002. WT believed that the risk assessment should also be reviewed. Without further major investigation, WT was unable to discover the amount of contingency that had been built into the baseline figures within the Cost Plan.

Review of other past and future capital projects

9.71. WT reviewed one completed project and one future project from each of BAA's London airports to assess the efficiency and effectiveness of BAA's capital programmes. WT found that BAA had at times been too pessimistic in assessing contingency and risk and also that benchmarking needed to be more consistent and centrally controlled. WT also noted that BAA seemed very sensitive to criticisms of its procurement process which could lead to it discounting alternative methods or potential improvements.

BAA's procurement philosophy and processes

9.72. WT found that BAA is committed to a partnering¹ form of procurement, along the lines of that championed in the *Rethinking Construction* report prepared by the Construction Task Force in 1998. WT summarized the claimed key advantages gained from the collaborative nature of the partnering approach to procurement as:

- (a) increased productivity, turnover and profits;
- (b) continuous improvement and improved predictability of time and costs; and
- (c) satisfied customers.

9.73. WT noted that the critics of the partnering approach voiced the following main disadvantages:

- (a) the difficulty in realizing genuine collaborative working practices;
- (b) the requirement for robust and accurate benchmarking in order to measure performance and assess VFM; and
- (c) the partnering contractual arrangements may result in an increased exposure to risk.

9.74. WT found that the main potential problem resulting from the new approach to procurement related to benchmarking. Benchmarking is an important management tool for measuring continuous improvement and the effectiveness of the procurement process. From their investigation, WT concluded that although BAA's benchmarking in some areas and for some isolated components was good, benchmarking for whole projects was poor and for T5 was not of the highest quality, given the significant capex involved.

9.75. WT recommended that BAA improve its benchmarking by:

- (a) taking a more rigorous approach when comparing whole project costs;
- (b) ensuring that only genuinely comparable projects are compared and by being cautious when making use of international comparators and ensuring appropriate adjustments are made to the data;
- (c) making use of project life-cycle costs as well as initial capital costs when benchmarking; and
- (d) being cautious in the use of old data. Data for benchmarking may be invalidated over time due to changes such as technological advances and changes in construction techniques and/or in statutory requirements.

BAA's response to WT's report

9.76. BAA noted that the WT report had little content on the main area of interest that of WT's view on the reasonableness of BAA's capex estimates. BAA noted the WT proposal for an independent cost review

¹As described in the 'Rethinking Construction' report, 'partnering' involves two or more organizations working together to improve performance through agreeing mutual objectives, devising a way for resolving any disputes and committing themselves to continuous improvement, measuring progress and sharing the gains'.

of T5 and agreed with the need for this, to provide comfort to the airline community and to the BAA board, prior to final approval of the scope and phasing of the project. BAA intends to appoint Franklyn and Andrews (F&A) in this role. We note that F&A are no longer fully 'independent' as they have now merged with Mott MacDonald, one of the design consultants for T5.

9.77. BAA has undertaken to provide a further consultation exercise on T5 costs in 2003. In the interim period, BAA will be concluding its current series of studies on finalizing scope and reviewing risk and internal peer reviews. As well as the appointment of F&A to carry out the independent review, an updated 2002/03 price base cost plan will be provided by BAA in January 2003.

9.78. BAA recognized that benchmarking is often constrained by the quality and quantity of comparable data available. Providing these limitations are understood and adjusted for, BAA does not believe that the T5 benchmarking project is invalidated. BAA therefore accepted that the earlier F&A benchmark exercise contained certain technical limitations and has adjusted certain comparisons within the benchmarking report to reflect these. BAA noted, however, that these changes made no significant difference to the overall findings of the F&A report. As part of the 2003 F&A exercise outlined in paragraph 9.76 above, the T5 benchmarking study will again be reviewed and latest estimates included.

9.79. BAA agreed that T5 costs had risen, chiefly due to changes in scope and price adjustments. In addition, BAA said that it had provided considerable information on T5's corporate contingency and that PwC had already reviewed these costs, concluding that they were reasonable.

9.80. BAA said that its partnership approach to procurement was the right one, rather than the traditional approach advocated by WT. BAA pointed to the government approach to procurement partnering highlighted in various reports commissioned by the Government such as *Rethinking Construction* chaired by Sir John Egan in 1998 which advocated the use of integrated supply teams and partnering within the teams. BAA also noted the 'Achieving Excellence' initiative launched by the Chief Secretary to the Treasury in 1999 which counted partnering, team working and integrated procurement as key action points.

Airlines' views on BAA's capital investment

9.81. More detailed views of third parties on BAA's investment programme are included in Chapters 12 and 13. Various parties responded to BAA's CIP, among them airlines such as BA, Virgin, bmi, Britannia, United and Lufthansa. The LACC and the AOC also commented. Overall, it was noted that the 2002 CIP document is significantly more detailed than previous CIP documents, but that there was still insufficient information on individual projects and their costs and the underlying assumptions behind each project justification. The main issues raised by these parties are summarized in the following paragraphs.

9.82. After review of the CIP, BA noted that the key capital investment issues for BA were that:

- (a) BAA moves ahead with the T5 investment programme as soon as possible to achieve completion in 2011;
- (b) the TTS and baggage link between T5 and the parts of CTA from which BA's services operate are fully operational on the opening day of T5 in 2008; and
- (c) BAA seek to increase runway capacity at Heathrow in a sustainable way in the SERAS review process.

9.83. BA has also stated its concern over the need for master planning at Heathrow in part to form a more secure basis for effective consultation and to give greater clarity about the overall objectives, balance and size of the CIP. BA felt that there was a need to fundamentally review the eastern apron and maintenance area layout at Heathrow.

9.84. bmi said that it had not been involved in any of the consultations and planning of T5, despite the size of the capital investment involved. It noted that the size of the T5 capital programme suggested either that the project was hugely overcosted or overspecified. bmi also noted that the CTA development in the CIP was not scheduled to start until 2005 and would be completed after 2013. bmi believed this handed significant competitive advantage to BA operating out of T5. bmi wanted the CTA development brought forward to ensure that capacity and service quality for CTA carriers was protected and advanced. It

believed that the consultation process could be improved by providing further specific information about each project, such as a business case, expected revenues and running costs of the projects and the sources of remuneration.

9.85. The LACC highlighted Heathrow connectivity between terminals as a main concern, in particular questioning the workability of a road-based option for connectivity and the arrangements for T5 opening with a hybrid baggage system. The LACC also stated that the CTA required an improvement in operational capacity and quality both before and after T5 opening.

9.86. The LACC also questioned why BAA's capital investment was not based on a long-term vision, for example 30 years like the government White Paper. The LACC asked for a clearer definition of specific project outputs and noted that, whilst T5 outputs were broadly known, the planning standards and intended levels of service were not clear. The LACC also noted the perception among many carriers that much of the 'investment' in the CIP related to maintenance of outdated structure and should be categorized as such.

9.87. Virgin Atlantic found that the CIP contained insufficiently detailed information on the justification for each project as well as the associated costs. It voiced concern that there were risks that the projects within the CIP would not be delivered on time or at all, to budget and to the agreed specifications. It asked for a clear separation of capacity-enhancing investment expenditure from expenditure that will improve quality of service for airlines.

9.88. Lufthansa voiced concern that the CIP was not supported by a long-term master plan, particularly for Heathrow. Lufthansa also believed that the consultation process with the airlines was insufficient, particularly with regard to the specification of facilities at Heathrow.

9.89. The Heathrow AOC commented that the CIP lacked any commentary on overall strategy and possible major future developments that had formed part of the airlines' Heathrow master plan proposals. It had concerns over the lack of options for passenger and baggage inter-terminal connections when T5 became operational and the lack of sufficient data for the AOC to form a view on the best connections method. In addition, the AOC believed that greater investment was necessary at T2 to improve facilities such as the arrivals hall, baggage-handling areas and off-pier coaching. It was the AOC's view that some of the individual project costs appeared expensive at Heathrow compared with similar projects at other airports and it was considering the use of consultants to provide an independent view on cost transparency and value for money.

9.90. The Gatwick AOC stated that the scale of development there seemed appropriate and that the key issues were the non-availability of Pier 6 until 2006, the delivery of the midfield pier only when Gatwick reached 40 mppa, and the seemingly excessive car-parking expenditure.